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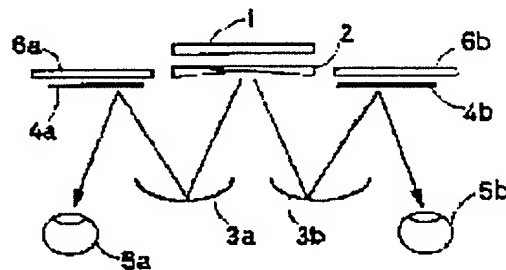
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(54) HEAD-MOUNT TYPE DISPLAY

(57)Abstract:

PROBLEM TO BE SOLVED: To enable smooth field-sequential stereoscopy without any flicker even when a video display element such as one liquid crystal is used.

SOLUTION: This display has the video display element 1 and observation optical systems 3a and 3b, and 4a and 4b which guide the video of the video display element 1 to the eyeballs 5a and 5b of an observer. In this case, the video display element 1 displays the video along scanning lines and the observation optical systems are so constituted as to include a special optical system 2 consisting of a combination of triangular prisms selectively separating a light beam into one of two by the scanning lines and guide at least one separated beam to the right eyeball 5a of the observer and the other separated beam to the left eyeball 5a of the observer.



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 CLAIMS
 

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## [Claim(s)]

[Claim 1] In the head wearing mold display which has a graphic display component and the observation optical system which leads the image of said graphic display component to an observer eyeball, while displaying an image along with the scanning line, said graphic display component Said observation optical system includes the special optical system which divides a beam of light into two any they are selectively for said every scanning line. The head wearing mold display characterized by being constituted so that one separated at least may be led to an observer right lateral eye ball and other one separated at least may be led to an observer left lateral eye ball.

[Claim 2] In the head wearing mold display which has a graphic display component and the observation optical system which leads the image of said graphic display component to an observer eyeball An optical-path separation means by which have the means which said graphic display component displays that the polarization directions differ 90 abbreviation with the even number scanning line and the odd number scanning line, and said observation optical system divides the light from said graphic display component into two, The 1st polarizing plate prepared on one optical path divided by said optical-path division means, It has the 2nd polarizing plate which was prepared on other optical paths divided by said optical-path division means, and was made to rotate said the 1st polarizing plate and polarization shaft 90 degrees, and was prepared. The head wearing mold display characterized by being constituted so that the beam of light which passed said 2nd polarizing plate for the beam of light which passed said 1st polarizing plate in the observer right lateral eye ball may be led to an observer left lateral eye ball, respectively.

[Claim 3] In the head wearing mold display which has a graphic display component and the observation optical system which leads the image of said graphic display component to an observer eyeball It has the means which said graphic display component displays that the polarization directions differ 90 abbreviation with the even number scanning line and the odd number scanning line. Said observation optical system chooses passage and an echo according to the polarization direction of said graphic display component. It has the polarization half mirror which separates the image of the even number scanning line and the image of the odd number scanning line which are displayed on said graphic display component. The head wearing mold display characterized by being constituted so that an optical path may be led to an observer right lateral eye ball and while it was separated by said polarization half mirror may lead the optical path of another side to an observer left lateral eye ball.

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**DETAILED DESCRIPTION**


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[Detailed Description of the Invention]

[0001]

[Field of the Invention] About a head wearing mold display, especially, this invention projects an image on both eyes with one graphic display component like a liquid crystal display, and relates to the head wearing mold display which can do field sequential stereoscopic vision.

[0002]

[Description of the Prior Art] The configuration of the outline of the conventional head wearing mold display which displays the solid video signal of a field sequential system on drawing 11 at the graphic display component 1 of one sheet is shown (JP,6-102469,A). For example, if the video signal for right eyes in the even number field and the odd number field consider as the video signal for right eyes, when the even number field is displayed on the graphic display component 1, field-of-view transfer device 2-a which exists at hand [ right ] is opened, and field-of-view transfer device 2-b which exists at hand [ left ] is closed, and projects an image only on a right eye. It becomes this and reverse when the odd number field is displayed. The video signal for left eyes is a left eye as mentioned above, and the video signal for right eyes will be observed by the right eye, and can do field sequential stereoscopic vision.

[0003]

[Problem(s) to be Solved by the Invention] However, if a field-of-view transfer device is opened and closed every other field, the image observed with one eye is intercepted every other field, and this will serve as a flicker and it will cause fatigue.

[0004] Moreover, in which flash, when a graphic display component is a liquid crystal display, although it is not very perfect on a liquid crystal display, the image for right eyes and the image for left are shown by the memory effect of liquid crystal. Therefore, an image is not visible to a stereo only by opening and closing a field-of-view transfer device on either side by turns for every field (change of the polarization direction by the polarizing plate).

[0005] This invention is made in view of the trouble of the above conventional techniques, and the object is offering the head wearing mold display in which smooth field sequential stereoscopic vision's is possible, without flickering, even if it uses a graphic display component like the liquid crystal display of one sheet.

[0006]

[Means for Solving the Problem] The 1st head wearing mold display of this invention which attains the above-mentioned object In the head wearing mold display which has a graphic display component and the observation optical system which leads the image of said graphic display component to an observer eyeball, while displaying an image along with the scanning line, said graphic display component Said observation optical system is characterized by being constituted so that one separated at least may be led to an observer right lateral eye ball including the special optical system which divides a beam of light into two any they are selectively for said every scanning line and other one separated at least may be led to an observer left lateral eye ball.

[0007] In the head wearing mold display which has the observation optical system by which the 2nd head wearing mold display of this invention leads the image of a graphic display component and said graphic display component to an observer eyeball An optical-path separation means by which have the means which said graphic display component displays that the polarization directions differ 90 abbreviation with the even number scanning line and the odd number scanning line, and said observation optical system divides the light from said graphic display component into two, The 1st polarizing plate prepared on one optical path divided by said optical-path division means, It has the 2nd polarizing plate which was prepared on other optical paths divided by said optical-path division means, and was made to rotate said the 1st polarizing plate and polarization shaft 90 degrees, and was prepared. It is characterized by being constituted so that the beam of light which passed said 2nd polarizing plate for the beam of light which passed said 1st polarizing plate in the observer right lateral eye ball may be led to an observer left lateral eye ball, respectively.

[0008] In the head wearing mold display which has the observation optical system by which the 3rd head wearing mold display of this invention leads the image of a graphic display component and said graphic display component to an observer eyeball It has the means which said graphic display component displays that the polarization directions differ 90 abbreviation with the even number scanning line and the odd number scanning line. Said observation optical system chooses passage and an echo according to the polarization direction of said graphic display component. It has the polarization half mirror which separates the image of the even number scanning line and the image of the odd number scanning line which are displayed on said graphic display component. It is characterized by being constituted so that an optical path may be led to an observer right lateral eye ball and while it was separated by said polarization half mirror may lead the optical path of another side to an observer left lateral eye ball.

[0009] Hereafter, the reason and operation which take the above-mentioned configuration in this invention are explained. In the 1st head wearing mold display, for every scanning line of a graphic display component, the image of the even number field and the odd number field will carry out incidence to any of an eyeball on either side, respectively, and a field

sequential solid video signal can be observed as a stereoscopic model according to the special optical system which divides a beam of light into two any they are selectively.

[0010] In this case, one per scanning line may be arranged and special optical system may become so that it may turn [ optical element / wedge-shaped (triangle) ] to an opposite direction to the odd number scanning line of a graphic display component, and the even number scanning line, respectively. With this configuration, by having arranged one per scanning line so that it may turn [ optical element / wedge-shaped (triangle) ] to an opposite direction to the odd number scanning line of a graphic display component, and the even number scanning line, respectively, the light of the odd-numbered scanning line and the light of the even-numbered scanning line can be distributed to right and left, go into eyepiece optical system, and carry out incidence for any of an eyeball on either side being respectively. That is, since the image of the odd number field and the even number field is separated and observed, field sequential stereoscopic vision becomes possible.

[0011] Moreover, in the 1st head wearing mold display, a large number may be arranged per scanning line, and special optical system may become so that it may turn [ optical element / wedge-shaped (triangle) ] to an opposite direction to the odd number scanning line of said graphic display component, and the even number scanning line, respectively. With this configuration, by having arranged a large number per scanning line so that it may turn [ optical element / wedge-shaped (triangle) ] to an opposite direction to the odd number scanning line of a graphic display component, and the even number scanning line, respectively, the light of the odd-numbered scanning line and the light of the even-numbered scanning line can be distributed to right and left, go into eyepiece optical system, and carry out incidence for any of an eyeball on either side being respectively. That is, since the image of the odd number field and the even number field is separated and observed, field sequential stereoscopic vision becomes possible. In this case, thickness of special optical system can be made thin.

[0012] Furthermore, in the 1st head wearing mold display, a graphic display component is constituted so that the incident light to special optical system may have the predetermined polarization direction. The special optical system shall consist of what made the component which rotates the polarization direction 90 degrees, and the component to which the polarization direction is not changed the same width of face as the scanning-line width of face of a graphic display component, and piled them up by turns, and two polarizing plates arranged in front of each eyeball of an observer. With this configuration, as opposed to light with the predetermined polarization direction of a graphic display component, as for the beam of light of the even-number scanning line, the polarization direction is operated 90 degrees, and, as for the beam of light of the odd-number scanning line, the polarization direction is not operated according to the optical system which made the component which rotates the polarization direction 90 degrees, and the component to which the polarization direction is not changed the same width of face as the scanning-line width of face of a graphic display component, and piled them up by turns. Although all such light is drawn even to an eyeball according to observation optical system, by shifting a polarization shaft mutual one sheet at a time 90 degrees in the face of right and left of a polarizing plate, and arranging it to it, the image of a left eye and the even number field is observed by the right eye, and the field sequential stereoscopic vision of the image of the odd number field becomes possible.

[0013] Moreover, it shall consist of what the graphic display component was constituted so that the incident light to special optical system might have the predetermined polarization direction, this special optical system made the component which rotates the polarization direction 90 degrees, and the component to which the polarization direction is not changed the same width of face as the scanning-line width of face of a graphic display component, and was piled up by turns, and a polarization half mirror in the 1st head wearing mold display. With this configuration, as opposed to light with the predetermined polarization direction of a graphic display component, as for the beam of light of the even-number scanning line, the polarization direction is operated 90 degrees, and, as for the beam of light of the odd-number scanning line, the polarization direction is not operated according to the optical system which made the component which rotates the polarization direction 90 degrees, and the component to which the polarization direction is not changed the same width of face as the scanning-line width of face of a graphic display component, and piled them up by turns. Since incidence of all such light is carried out to a polarization half mirror, the image of the odd number field and the image of the even number field are separated since transparency and an S wave (for example, light of the even number scanning line) are reflected for a P wave (for example, light of the odd number scanning line) to a polarization half mirror, and it is led to an eyeball according to observation optical system, the image of a left eye and the even number field is observed by the right eye, and the field sequential stereoscopic vision of the image of the odd number field becomes possible.

[0014] Moreover, in the 1st head wearing mold display, a graphic display component shall be constituted so that the incident light to special optical system may have the predetermined polarization direction, and this special optical system shall consist of a component which controls the polarization direction of a scan mold, and two polarizing plates arranged in front of each eyeball of an observer. With this configuration, the beam of light from a graphic display component has the predetermined polarization direction, for example, the polarization direction rotates 90 degrees with the component by which the light of that even number field controls the polarization direction of a scan mold, and the light of the odd number field presupposes that the polarization direction is not controlled. Although all such light is drawn even to an eyeball according to observation optical system, by shifting a polarization shaft mutual one sheet at a time 90 degrees in the face of right and left of a polarizing plate, and arranging it to it, the image of a left eye and the even number field is observed by the right eye, and the field sequential stereoscopic vision of the image of the odd number field becomes possible.

[0015] Furthermore, in the 1st head wearing mold display, said graphic display component shall be constituted so that the incident light to special optical system may have the predetermined polarization direction, and this special optical system shall consist of a component which controls the polarization direction of a scan mold, and a polarization half mirror. With this configuration, the beam of light from a graphic display component has the predetermined polarization direction, for example, the polarization direction rotates 90 degrees with the component by which the light of that even number field controls the polarization direction of a scan mold, and the light of the odd number field presupposes that the polarization direction is not controlled. Since incidence of all such light is carried out to a polarization half mirror, the image of the odd number field and the image of the even number field are separated since transparency and an S wave (for example, light of

the even number scanning line) are reflected for a P wave (for example, light of the odd number scanning line) to a polarization half mirror, and it is led to an eyeball according to observation optical system, the image of a left eye and the even number field is observed by the right eye, and the field sequential stereoscopic vision of the image of the odd number field becomes possible.

[0016] Next, although the light from the graphic display component from which the polarization direction differs 90 degrees with the odd number scanning line and the even number scanning line is drawn even to an eyeball according to observation optical system in the 2nd head wearing mold display of this invention. By shifting a polarization shaft mutual one sheet at a time 90 degrees in the face of right and left of a polarizing plate, and arranging it to it, incidence of the image of the even number field and the odd number field will be carried out for any of an eyeball on either side being respectively, and it can observe a field sequential solid video signal by the stereo.

[0017] Furthermore, it sets on the 3rd head wearing mold display of this invention. All the light from the graphic display component from which the polarization direction differs 90 degrees with the odd number scanning line and the even number scanning line. Since transparency and an S wave (for example, light of the even number scanning line) are reflected for a P wave (for example, light of the odd number scanning line) to a polarization half mirror by carrying out incidence to a polarization half mirror. Since it dissociates and the image of the odd number field and the image of the even number field are led to an eyeball according to observation optical system, the image of a left eye and the even number field is observed by the right eye, and the field sequential stereoscopic vision of the image of the odd number field becomes possible.

[0018]

[Embodiment of the Invention] Hereafter, the examples 1-8 of the head wearing mold display of this invention are explained for a drawing, making it reference.

[Example 1] Drawing 1 is optical-path drawing of the head wearing mold display of this example, and an image is separated according to the field by right and left in an operation of the after-mentioned optical system 2 by which the field sequential image of one full line actuation graphic display device 1 has been arranged near the screen of a graphic display device 1. Here, a full line actuation graphic display device is a graphic display device with the scanning line for one frame of NTSC. An amplification echo is carried out by the mirrors 3a and 3b with power, it is again reflected by half mirrors 4a and 4b, and incidence of the image divided into right and left is carried out to the eyes 5a and 5b on either side. If the liquid crystal shutters 6a and 6b arranged at the external world side of half mirrors 4a and 4b are closed at this time, only the image of a graphic display device 1 is observable, and if it opens, an image and the scene of the external world are overlapped simultaneously and it can observe. In drawing 1, Mirrors 3a and 3b and the half mirrors 4a and 4b with power may be unified using prism, although illustrated as another object.

[0019] If a beam of light carries out incidence of the structure of optical system 2 vertically as shown in the base of the prism 21 of a triangle as shows a perspective view to drawing 2 (a) at drawing 2 (b), as shown in drawing 2 (c), using outgoing radiation light being deflected. It is what carried out prism 21 by turns, carried out the sense reversely, and has been arranged for every scan line of a display image, and odd lines of a display image and the operation which distributes light to right and left every even lines are carried out. Although drawing 2 (c) is an example which has arranged one prism 21 per scanning line, as shown in drawing 2 (d), it may arrange many prism 21 per scanning line.

[0020] When the prism 21 of the triangle shown in drawing 2 (a) is used, since it was displayed every other scanning line, the image observed with one eye is somewhat observed as a coarse image. Then, if the field of the outgoing radiation light of the prism 21 of the triangle of drawing 2 (a) is made into a concave lens side (negative cylindrical side which has a bus-bar in a prism longitudinal direction), since the outgoing radiation light of the scanning line comes to have breadth area, the granularity of an image decreases.

[0021] By the above configurations, even when the image of a graphic display device 1 is a 2D image, an image can be observed only by connecting a signal, without operating equipment in any way.

[0022] Since the image scanned in the field in front of one by the memory effect of liquid crystal is displayed when a graphic display device 1 is a liquid crystal display, the image for right eyes is displayed also in the scan in the image for left eyes. Therefore, since the image observed with one eye is not intercepted, a smooth image is observed, without flickering.

[0023] [Example 2] Drawing 3 is optical-path drawing of the head wearing mold display of this example, and the light which comes out from one liquid crystal display 1 which is not full line actuation has the polarizability of the specific direction for the screen side polarizing plate of a liquid crystal display 1. The polarization direction of this light is changed synchronizing with the scan of a liquid crystal display 1 by the plane-of-polarization revolution component 7 which rotates the polarization directions, such as a ferroelectric liquid crystal (FLC) or antiferroelectricity liquid crystal (AFLC). A half mirror 8 divides into two optical paths, and through a reflecting mirror 10, the transmitted light is expanded by the mirrors 3a and 3b with direct power, respectively, passes left eye polarizing plate 9a and right eye polarizing plate 9b, and carries out incidence of the reflected light to left eye 5a and right eye 5b. The polarization shaft of polarizing plate 9a and polarizing plate 9b is shifted 90 degrees mutually.

[0024] With the above configurations, when carrying out field sequential stereoscopic vision, the even number field of a video signal makes the signal for right eyes, and the odd number field the signal for left eyes temporarily. As shown in drawing 4 (a), while the liquid crystal display 1 is scanning the odd number field, the plane-of-polarization revolution component 7 is scanned so that it may correspond to the location of the scan line synchronizing with the scan of a liquid crystal display 1, and the polarization direction is changed one by one so that it may be in agreement in the polarization direction of left eye polarizing plate 9a.

[0025] As shown in drawing 4 (b), similarly, the plane-of-polarization revolution component 7 is scanned so that it may correspond to the location of the scan line synchronizing with the scan of a liquid crystal display 1, and while scanning the even number field, the polarization direction is changed one by one so that it may be in agreement in the polarization direction of right eye polarizing plate 9b.

[0026] Since only the image of the even number field will be observed by the image of the odd number field, and right eye 5b with polarizing plates 9a and 9b at left eye 5a even if the even number or the odd number field in front of 1 field is

displayed while scanning odd number or the even number field by the memory effect of liquid crystal if the above actuation is carried out, field sequential stereoscopic vision becomes possible and the smooth image not flickering is observed.

[0027] In this example, the image of the right and left in two sheets to polarizing plates 9a and 9b is changed to the plane-of-polarization revolution component 7 which consists of a ferroelectric liquid crystal or antiferroelectricity liquid crystal, polarizing plates 9a and 9b are dramatically light in this, and since it can be said to be only one sheet of the plane-of-polarization revolution component 7 in weight, it becomes more advantageous than the conventional example.

[0028] Furthermore, although two shutters were used for changing a visual field with the conventional technique, the before field can be observed by the eye on either side by rotating left eye polarizing plate 9a 90 degrees around an optical axis, and the revolution being interlocked with, and suspending actuation of the plane-of-polarization revolution component 7 to carry out 2D observation.

[0029] [Example 3] This example is an example in case a liquid crystal display 1 is full line actuation in the example 2 of drawing 3. Change of the polarization direction of the plane-of-polarization revolution component 7 which rotates the polarization directions, such as a ferroelectric liquid crystal (FLC) and antiferroelectricity liquid crystal (AFLC), is performed so that it may correspond to the odd number of a liquid crystal display 1, and the even number scanning line, and the actuation is considered as immobilization.

[0030] Since the light from a liquid crystal display 1 is polarizing, make in agreement the polarization shaft of the polarization direction and left eye polarizing plate 9a, and the polarization direction of the light of an odd number field line is not operated in the plane-of-polarization revolution component 7, but the polarization direction of the light of an even number field line is changed 90 degrees by the plane-of-polarization revolution component 7, and is made in agreement with the polarization shaft of right eye polarizing plate 9b.

[0031] Since the image scanned in the field in front of one by the memory effect of liquid crystal by field sequential stereoscopic vision becoming possible since the light of an odd number field line was observed by only left eye 5a and the light of an even number field line was observed by only right eye 5b by the above configuration is displayed, the image for right eyes is displayed also in the scan in the image for left eyes. Therefore, since the image observed with one eye is not intercepted, a smooth image is observed, without flickering.

[0032] Instead of the plane-of-polarization revolution component 7 which rotates the polarization directions, such as a ferroelectric liquid crystal (FLC) or antiferroelectricity liquid crystal (AFLC), phase plate 7' of a configuration as shown in drawing 5 may be used. The configuration of phase plate 7' of drawing 5 is the thing of the structure which thickness spread the glass 72 of directions [ wavelength plate / 71 / which is made to rotate the polarization direction 90 degrees / 1/2 ] on the size of the scanning line of a liquid crystal display 1, respectively, carried out abbreviation etc., and was piled up by turns [ those ], as the part is expanded and it is shown on the same drawing. And this phase plate 7' is made to rival in a liquid crystal display 1 so that a wavelength plate 71 and glass 72 may not shift to the scanning line of a liquid crystal display 1. If it piles up so that the light of the odd number field line of a liquid crystal display 1 may carry out incidence of the light of glass 72 and an even number field line to 1/2 wavelength plate 71 made to rotate the polarization direction 90 degrees, respectively, as shown in drawing 6, only the light of an even number field line will rotate the polarization direction 90 degrees. Therefore, since the polarization directions of the light of the image of the odd number field and the light of the image of the even number field differ, only the image of the odd number field is observed by left eye 5a by polarizing plate 9a for left and only the image of the even number field is observed by right eye 5b by polarizing plate 9b for right eyes, field sequential stereoscopic vision becomes possible.

[0033] [Example 4] Drawing 7 is optical-path drawing of the head wearing mold display of this example, and the light which comes out from one liquid crystal display 1 which is not full line actuation has the polarizability of the specific direction for the screen side polarizing plate of a liquid crystal display 1. The polarization direction of this light is changed according to the scan of a liquid crystal display 1 by the plane-of-polarization revolution component 7 which rotates the polarization directions, such as a ferroelectric liquid crystal (FLC) or antiferroelectricity liquid crystal (AFLC), and incidence is carried out to the polarization half mirror 11. Through a reflecting mirror 10, the light which there is a property reflected if incident light is a P wave and it is transparency and an S wave, and was separated by the polarization half mirror 11 is expanded by the mirrors 3a and 3b with direct power, respectively, and the polarization half mirror 11 carries out [ the transmitted light ] incidence of the reflected light to left eye 5a and right eye 5b.

[0034] With the above configurations, when carrying out field sequential stereoscopic vision, the even number field of a video signal makes the signal for right eyes, and the odd number field the signal for left eyes temporarily. As shown in drawing 4 (b), while the liquid crystal display 1 is scanning the even number field, the plane-of-polarization revolution component 7 is scanned so that it may correspond to the location of the scan line synchronizing with the scan of a liquid crystal display 1, and the polarization direction is made to become an S wave (echo) to the polarization half mirror 11.

[0035] As shown in drawing 4 (a), while similarly scanning odd number FIRODO, the plane-of-polarization revolution component 7 is scanned so that it may correspond to the location of the scan line synchronizing with the scan of a liquid crystal display 1, and the polarization direction is made to become a P wave (transparency) to the polarization half mirror 11.

[0036] In this way, an odd number field line penetrates the polarization half mirror 11, and is observed by left eye 5a. It is reflected by the polarization half mirror 11, and an even number field line is observed by right eye 5b. Therefore, field sequential stereoscopic vision becomes possible, and since the image scanned in the one field by the memory effect of liquid crystal is displayed, the image for right eyes is displayed also in the scan in the image for left eyes. Since the image observed with one eye is not intercepted, a smooth image is observed without flickering.

[0037] [Example 5] In an example 4, when the liquid crystal display 1 of drawing 7 is a full line actuation mold, change of the polarization direction of the plane-of-polarization revolution component 7 which rotates the polarization directions, such as a ferroelectric liquid crystal (FLC) or antiferroelectricity liquid crystal (AFLC), is performed so that it may correspond to the odd number of a liquid crystal display 1, and the even number scanning line, and the actuation is considered as immobilization.



[0038] Since the light from a liquid crystal display 1 is polarizing, if arrange so that it may become a P wave to the polarization half mirror 11, and only the light of an even number field line is made to become an S wave to the polarization half mirror 11 with the plane-of-polarization revolution component 7 and it is made for the light of an odd number field line not to change polarization, the light (P wave) of an even number field line will penetrate the light (S wave) of an odd number field line with the polarization half mirror 11. Incidence of the transmitted light of the polarization half mirror 11 is carried out to left eye 5a by mirror 3a with a reflecting mirror 10 and power, and incidence of the reflected light of the polarization half mirror 11 is carried out to right eye 5b by mirror 3b with power.

[0039] In this way, since the image of the even number field of a liquid crystal display 1 is observed by right eye 5b and the image of the odd number field is observed by left eye 5a, field sequential stereoscopic vision becomes possible.

[0040] Since the image scanned in the field in front of one by the memory effect of liquid crystal is displayed, the image for right eyes is displayed also in the scan in the image for left eyes. Therefore, since the image observed with one eye is not intercepted, a smooth image is observed, without flickering.

[0041] Instead of the plane-of-polarization revolution component 7 which rotates the polarization directions, such as a ferroelectric liquid crystal (FLC) or antiferroelectricity liquid crystal (AFLC), phase plate 7' of a configuration as shown in drawing 5 may be used. The configuration of phase plate 7' of drawing 5 is the thing of the structure which thickness spread the glass 72 of directions [ wavelength plate / 71 / which is made to rotate the polarization direction 90 degrees / 1/2 ] on the size of the scanning line of a liquid crystal display 1, respectively, carried out abbreviation etc., and was piled up by turns [ those ], as the part is expanded and it is shown on the same drawing. And this phase plate 7' is made to rival in a liquid crystal display 1 so that a wavelength plate 71 and glass 72 may not shift to the scanning line of a liquid crystal display 1. If it piles up so that the light of the odd number field line of a liquid crystal display 1 may carry out incidence of the light of glass 72 and an even number field line to 1/2 wavelength plate 71 made to rotate the polarization direction 90 degrees, respectively, as shown in drawing 6, only the light of an even number field line will rotate the polarization direction 90 degrees. Therefore, the polarization directions of the light of the image of the odd number field and the light of the image of the even number field differ, and since the image of the even number field and the transmitted light of the polarization half mirror 11 serve as an image of the odd number field, the field sequential stereoscopic vision of the reflected light of the polarization half mirror 11 becomes possible.

[0042] [Example 6] In this example, the structure of a liquid crystal display 1 is filled up with the liquid crystal molecule between two polarizing plates 12 and 13 which shifted the polarization shaft 90 degrees mutually. these two polarizing plates 12 and 13 -- as each structure is shown in drawing 8, the polarization shafts of a part with which the polarization shaft was rotating 90 degrees for every odd number and even number scanning line, and two polarizing plates 12 and 13 faced each other also differ 90 degrees mutually. With above configurations, the polarization direction changes 90 degrees mutually with the image of the odd number field, and the image of the even number field. Drawing 9 is optical-path drawing of one example of the equipment which performs field sequential stereoscopic vision using the liquid crystal display 1 of drawing 8. The image of the odd number field of a liquid crystal display 1, As for the image of the even number field, the polarization directions differ 90 degrees mutually, and carry out incidence to a half mirror 8, swerve to it, and such light is carried out for \*\* 2 minutes. By being expanded according to the eyepiece optical system 3a and 3b, respectively, differing 90 degrees mutually and arranging the polarization shaft of the impending polarizing plates 9a and 9b on either side mutually For example, the image of the even number field is observed by right eye 5b, the image of the odd number field is observed by left eye 5a, and field sequential stereoscopic vision becomes possible.

[0043] [Example 7] Also in this example, the structure of a liquid crystal display 1 is filled up with the liquid crystal molecule between two polarizing plates 12 and 13 which shifted the polarization shaft 90 degrees mutually. these two polarizing plates 12 and 13 -- as each structure is shown in drawing 8, the polarization shafts of a part with which the polarization shaft was rotating 90 degrees for every odd number and even number scanning line, and two polarizing plates 12 and 13 faced each other also differ 90 degrees mutually. With above configurations, the polarization direction changes 90 degrees mutually with the image of the odd number field, and the image of the even number field. Drawing 10 is optical-path drawing of another example of the equipment which performs field sequential stereoscopic vision using the liquid crystal display 1 of drawing 8. The image of the odd number field of a liquid crystal display 1, Since, as for the image of the even number field, the polarization directions differ 90 degrees mutually, and incidence of such light is carried out to the polarization half mirror 11, and it reflects to the polarization half mirror 11 if it is a P wave and is transparency and an S wave the transmitted light and the reflected light -- respectively -- eyepiece optical-system 3a -- if it 3b minds and incidence is carried out to an eye on either side, the image of the even number field will be observed by right eye 5b, the image of the odd number field will be observed by left eye 5a, and field sequential stereoscopic vision will become possible, for example.

[0044] [Example 8] Although the polarization direction used a liquid crystal display 1 different 90 degrees mutually with the image of the odd number field, and the image of the even number field in the examples 6 and 7 Instead, if the polarizing plate is arranged using CRT so that a polarization shaft may be differed 90 degrees for every odd number and even number scanning line of the luminescence side, since the polarization directions differ 90 degrees mutually with the image of the odd number field, and the image of the even number field If such CRT is used instead of the liquid crystal display 1 of examples 6 and 7, the same field sequential stereoscopic vision will become possible.

[0045] As mentioned above, although the head wearing mold display of this invention has been explained based on some examples, this invention is not limited to these examples, but various deformation is possible for it. The head wearing mold display of the above this invention can be constituted as follows, for example.

[0046] [1] In the head wearing mold display which has a graphic display component and the observation optical system which leads the image of said graphic display component to an observer eyeball, while displaying an image along with the scanning line, said graphic display component Said observation optical system includes the special optical system which divides a beam of light into two any they are selectively for said every scanning line. The head wearing mold display characterized by being constituted so that one separated at least may be led to an observer right lateral eye ball and other

one separated at least may be led to an observer left lateral eye ball.

[0047] [2] The head wearing mold display characterized by being what one per scanning line is arranged and the aforementioned special optical system becomes in the above [1] so that it may turn [ optical element / wedge-shaped (triangle) ] to an opposite direction to the odd number scanning line of said graphic display component, and the even number scanning line, respectively.

[0048] [3] The head wearing mold display characterized by being what a large number are arranged per scanning line, and the aforementioned special optical system becomes in the above [1] so that it may turn [ optical element / wedge-shaped (triangle) ] to an opposite direction to the odd number scanning line of said graphic display component, and the even number scanning line, respectively.

[0049] [4] In the above [1], constitute said graphic display component so that the incident light to said special optical system may have the predetermined polarization direction. The head wearing mold display characterize by said special optical system consist of what made the component which rotates the polarization direction 90 degrees , and the component to which the polarization direction is not change the same width of face as the scanning-line width of face of said graphic display component , and piled them up by turns , and two polarizing plates arrange in front of each eyeball of an observer .

[0050] [5] The head wearing mold display characterized by to consist of what said graphic-display component was constituted in the above [1] so that the incident light to said special optical system might have the predetermined polarization direction, said special optical system made the component which rotates the polarization direction 90 degrees, and the component to which the polarization direction is not changed the same width of face as the scanning-line width of face of said graphic-display component, and piled up by turns, and a polarization half mirror.

[0051] [6] The head wearing mold display characterized by constituting said graphic display component in the above [1] so that the incident light to said special optical system may have the predetermined polarization direction, and said special optical system consisting of a component which controls the polarization direction of a scan mold, and two polarizing plates arranged in front of each eyeball of an observer.

[0052] [7] The head wearing mold display characterized by constituting said graphic display component in the above [1] so that the incident light to said special optical system may have the predetermined polarization direction, and said special optical system consisting of a component which controls the polarization direction of a scan mold, and a polarization half mirror.

[0053] [8] In the head wearing mold display which has a graphic display component and the observation optical system which leads the image of said graphic display component to an observer eyeball An optical-path separation means by which have the means which said graphic display component displays that the polarization directions differ 90 abbreviation with the even number scanning line and the odd number scanning line, and said observation optical system divides the light from said graphic display component into two, The 1st polarizing plate prepared on one optical path divided by said optical-path division means, It has the 2nd polarizing plate which was prepared on other optical paths divided by said optical-path division means, and was made to rotate said the 1st polarizing plate and polarization shaft 90 degrees, and was prepared. The head wearing mold display characterized by being constituted so that the beam of light which passed said 2nd polarizing plate for the beam of light which passed said 1st polarizing plate in the observer right lateral eye ball may be led to an observer left lateral eye ball, respectively.

[0054] [9] In the head wearing mold display which has a graphic display component and the observation optical system which leads the image of said graphic display component to an observer eyeball It has the means which said graphic display component displays that the polarization directions differ 90 abbreviation with the even number scanning line and the odd number scanning line. Said observation optical system chooses passage and an echo according to the polarization direction of said graphic display component. It has the polarization half mirror which separates the image of the even number scanning line and the image of the odd number scanning line which are displayed on said graphic display component. The head wearing mold display characterized by being constituted so that an optical path may be led to an observer right lateral eye ball and while it was separated by said polarization half mirror may lead the optical path of another side to an observer left lateral eye ball.

[0055]

[Effect of the Invention] According to the head wearing mold display of this invention, smooth field sequential stereoscopic vision becomes possible, without flickering, even if it uses a graphic display component like the liquid crystal display of one sheet so that clearly from the above explanation.

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[Translation done.]



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3. In the drawings, any words are not translated.

## DESCRIPTION OF DRAWINGS

## [Brief Description of the Drawings]

[Drawing 1] It is optical-path drawing of the head wearing mold display of the example 1 of this invention.

[Drawing 2] It is drawing for explaining the structure of optical system for the image of an example 1 to separate into right and left.

[Drawing 3] It is optical-path drawing of the head wearing mold display of the example 2 of this invention.

[Drawing 4] It is drawing for explaining an operation of the plane-of-polarization revolution component in an example 2. .

[Drawing 5] It is the perspective view showing the configuration of the phase plate used in the modification of an example 3.

[Drawing 6] It is drawing for explaining an operation of the phase plate of drawing 5 .

[Drawing 7] It is optical-path drawing of the head wearing mold display of the example 4 of this invention.

[Drawing 8] It is the perspective view showing the structure of two polarizing plates of the liquid crystal display of an example 6.

[Drawing 9] It is optical-path drawing of the head wearing mold display of the example 6 of this invention.

[Drawing 10] It is optical-path drawing of the head wearing mold display of the example 7 of this invention.

[Drawing 11] It is drawing showing the configuration of the outline of one conventional head wearing mold display.

## [Description of Notations]

- 1 -- A graphic display device, liquid crystal display
- 2 -- Optical system which an image divides into right and left
- 3a, 3b -- Mirror with power
- 4a, 4b -- Half mirror
- 5a, 5b -- Eye on either side
- 6a, 6b -- Liquid crystal shutter
- 7 -- Plane-of-polarization revolution component
- 8 -- Half mirror
- 9a, 9b -- Polarizing plate
- 10 -- Reflecting mirror
- 11 -- Polarization half mirror
- 12 13 -- Polarizing plate
- 7' -- Phase plate
- 21 -- Triangular prism
- 71 -- 1/2 wavelength plate
- Glass of directions, such as 72 --

[Translation done.]

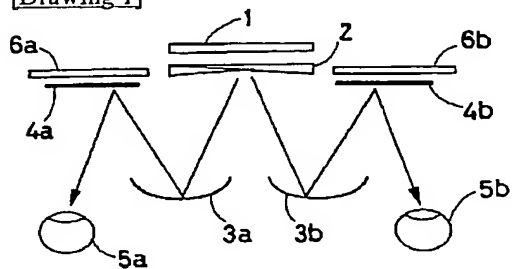
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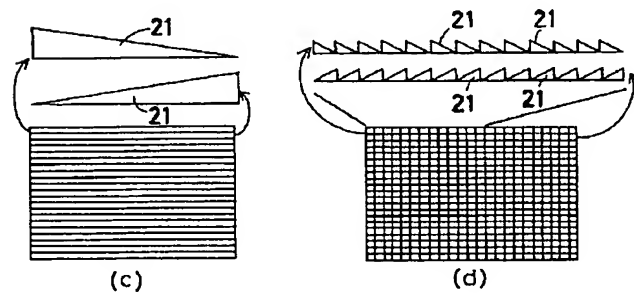
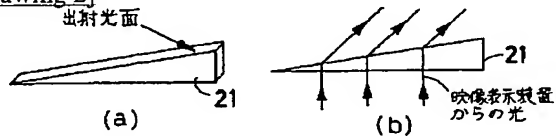
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## DRAWINGS

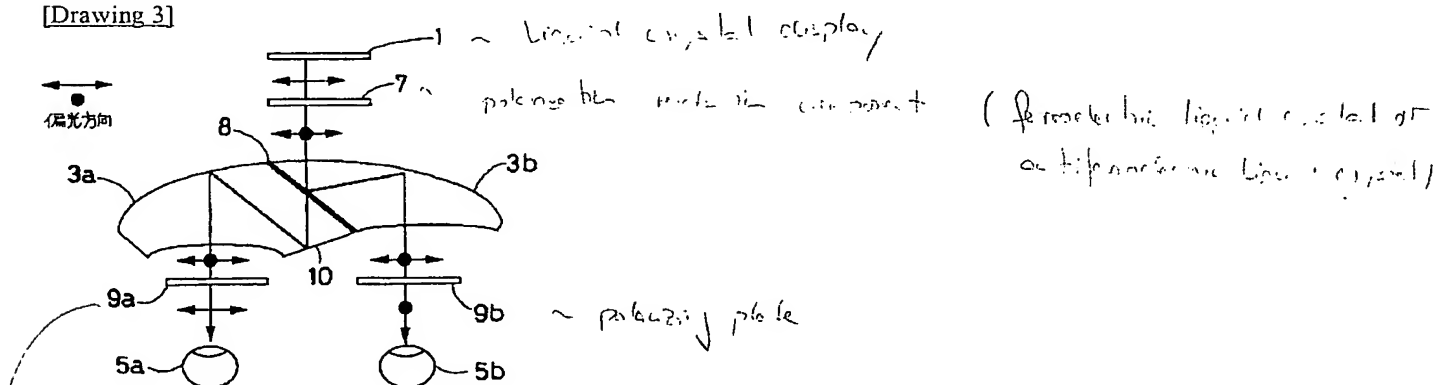
[Drawing 1]



[Drawing 2]

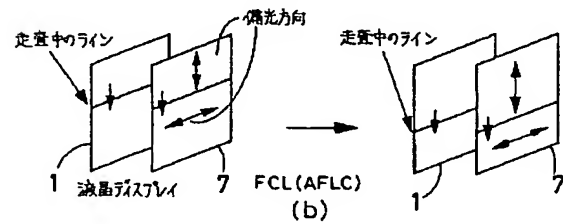
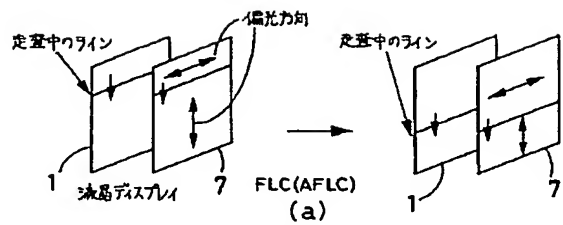


[Drawing 3]

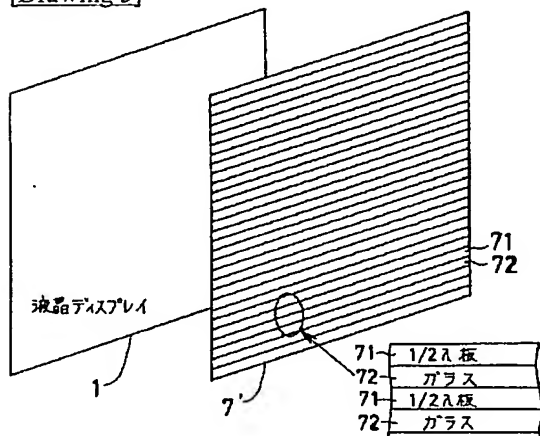


[Drawing 4]

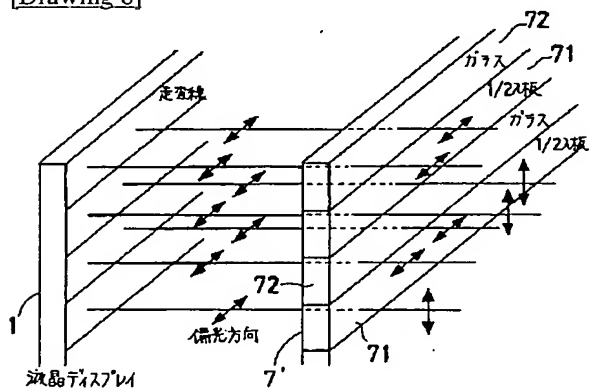
polarizing plate



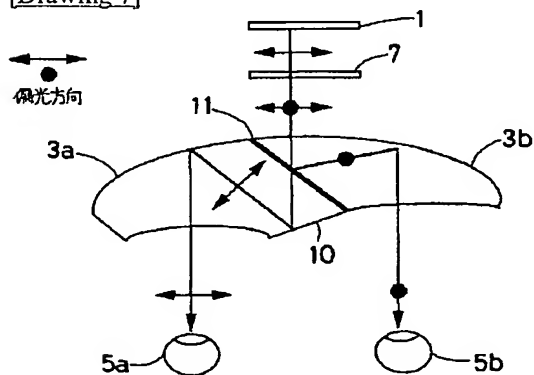
[Drawing 5]



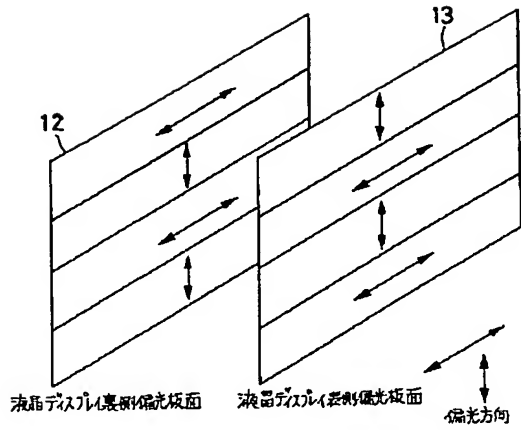
[Drawing 6]



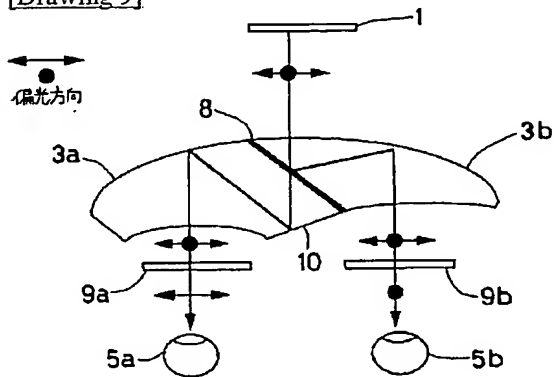
[Drawing 7]



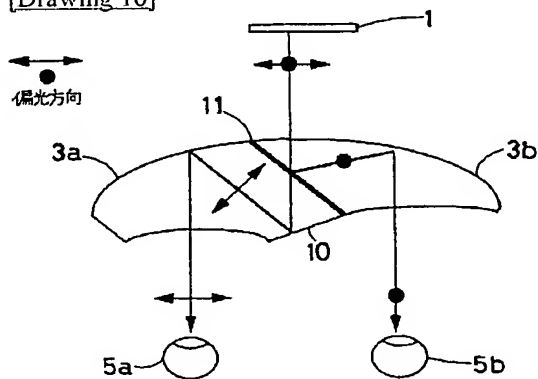
[Drawing 8]



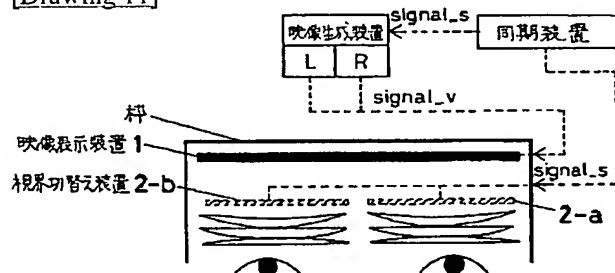
[Drawing 9]



[Drawing 10]



[Drawing 11]



[Translation done.]